

Incident Summary

Castlehill PS at Greenock WTW pH failures 12 May and 9 June 2017

DWQR Inspector:
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Event No. 8864>

Event Category: Significant

On the 12th May and 9th June 2017, regulatory samples from consumers' properties in the zone supplied by Castlehill Pumping Station (PS) failed the upper pH standard of 9.5, with results reading 9.6 and 9.8. Castlehill PS is located within the grounds of Greenock WTW, and supplies part of the Greenock water supply zone. Until the 7th February 2018, Castlehill PS had its own orthophosphoric acid and sodium hydroxide (caustic) dosing systems for plumbosolvency control and pH correction. This dosing is no longer in place due to rationalisation of treatment assets unrelated to this incident. The failing samples were raised as events by Scottish Water (event numbers 8454 and 8530), and the cause was reported to DWQR on 5th August as being an issue at the treatment works. Scottish Water raised a separate event (8864) at my request to report the treatment issue, and this was declared an incident. The sequence of events is outlined below.

On the 28th and 30th January 2017, Scottish Water's electrical and mechanical staff visited Castlehill PS to work on the caustic dosing system, as the pumps would not run on their automatic setting due to a fault with a flow switch on carrier water, and then an issue with the control of a pump. The faults were repaired.

On the 25th May 2017 the local display for the caustic system failed. The part required for the repair was not readily available, and would take for several months to be delivered, so Scottish Water decided that in order to maintain plumbosolvency control, the orthophosphoric acid and caustic dosing would be kept running. While operational staff could not locally view information at the caustic plant, and would not have been able to alter control settings, trends were visible in the control room and recorded on the telemetry system.

On the 9th June 2017, a routine pH bench test gave a reading of 10.3. The test was repeated a number of times, verifying the high pH, and the orthophosphoric acid and caustic plants were shut down. That same day, a regulatory sample in the network for pH failed the standard.

On the 12th June 2017, a contractor attended the site to repair the caustic display and fault find the system. It was found that there were a number of faults: the service water pressure regulating valve on the orthophosphoric acid dosing system was not operating and had to be replaced; the caustic pump control range had to be reset; there was a low flow in the sample line feeding the pH monitor.

Scottish Water's investigation identified that caustic consumption at the works had increased following the maintenance work on the caustic pumps at the end of January 2017, and the trend of caustic usage confirms this. The caustic pumps were capable of delivering up to 65l/h and the range setting of the pumps should have been set at 0 - 5l/h to deliver the required dose of caustic. This was achieved by setting software controls to prevent the pumps exceeding 5l/h. These safeguards appear to have been changed in January, with the range of one pump increasing to 0 - 20l/h on one pump and 0 - 65l/h on the other. After the faults were corrected, the system was put back online on the 12th June 2017.

The cause of the incident was overdosing of caustic, caused by a failure to adequately control and monitor caustic dosing.

The event has been categorised as Significant. Scottish Water has identified five actions which DWQR accepts are appropriate and will monitor to ensure they are completed prior to signing off the incident. DWQR made two additional recommendations.

